UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,150	11/26/2003	Vinoj N. Kumar	5-5	9235

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EXAMINER
BROWN, CHRISTOPHER J

ART UNIT	PAPER NUMBER
2439	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
	10/723,150	KUMAR ET AL.
Office Action Summary	Examiner	Art Unit	
	CHRISTOPHER J. BROWN	2439	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 November 2010</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant argues that Cathey and Holdsworth fail to teach the newly added limitation "each of the separate matching tables associated with that level comprising one or more entries each specifying a set of one or more values for the field associated with that level and each of the separate matching tables associated with a level corresponding to a different set of one or more values, for another field, specified by a respective one of a plurality of entries of another matching table associated with another level of the tree representation"

The examiner believes this portion of the amendment to be clear:

"each of the separate matching tables associated with that level comprising one or more entries each specifying a set of one or more values for the field associated with that level and each of the separate matching tables associated with a level corresponding to a different set of one or more values, "

However, the last 2 lines are not clear. "specified by a respective one of a plurality of entries of another matching table associated with another level of the tree representation"

Are the other entries supposed to indicate that the levels correspond with each other?   The support the applicant puts forth is only that a first level of a source address and a second level being a destination address.   The examiner is not clear what exactly "specified by a respective one of a plurality of entries of another matching table associated with another level of the tree representation" specifies that the source address corresponds to a destination address.

The examiner suggests the applicant rework the claim language to be more understandable and in line with the present invention.

As per the USC 103 rejection in view of Cathey and Holdsworth, the examiner believes the current rejection meets the new claim limitations. Cathey teaches levels and data sets associated with predefined data.   Holdsworth is relied upon to explicitly teach ACL lists. Cathey teaches a first level is source IP info, and a second level is Destination IP info.   While Cathey does not EXPLICITLY state a different set of values, Cathey reads on a different set of values in each node, because using the same values would be unproductive to the objective of Cathey. Holdsworth also supports different values because if each ACL had the exact same values, then all of the ACL's would be worthless. Only 1 ACL would be needed for the entire invention.   Cathey, like the present invention, as stated in the applican'ts support for the amendment, has a corresponding different set of values. The applicant has stated level 1 is source IP and level 2 is a corresponding level. Cathey teaches the same, as the decision is made based upon source IP which branch of different destination IP the data should be sent to.

Thus the rejection below is similar to the previous rejection.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The claimed invention is directed to non-statutory subject matter. A process qualifies to be considered for patenting if it (1) is implemented with a particular machine that is, one specifically devised and adapted to carry out the process in a way that is not concededly conventional and is not trivial; or else (2) transforms an article from one thing or state to another.

As per claim 20, Applicant sates "machine-readable storage medium" if this claim language was changed to "non-transitory computer readable storage medium" or "computer readable storage device" the 101 rejection would be overcome.

Claim Rejections - 35 USC § 103

Claims 1, 3-9, 11, 12, 15, 17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Cathey US 2002/0085560 in view of Holdsworth US 2003/0188198

As per claim 1, 20 Cathey teaches determining a plurality of rules (packet classification), each of at least a subset of the rules having a plurality of fields (extracted fields of header

data) and a corresponding action (identify application programs to execute); and processing the rules to generate a multi-level tree representation (classification logic is configured as a decision tree), (Fig 5B, [0052], [0061], [0063]). Cathey teaches each of one or more of the levels of the tree representation being associated with a corresponding one of the fields (level one associated with source address, level two associate with destination address) [0063]. Cathey teaches at least one level of the tree representation other than a root level of the tree representation comprises a plurality of nodes (Header Check 2, Fig 5B, [0063], Cathey teaches at least two of the nodes at that level each having a separate matching table associated therewith (header check 2 checks Internet Protocol Destination Address and compares to predefined data, and address tables),([0063], [0067], [0078]). Although the predefined data is not stated as different in Cathey, it would be well known to those of ordinary skill that it would be different as decisions are made to sort data into different branches.[0064], [0067]. Holdsworth below provides additional support. Cathey teaches one level of tables corresponding to a different level with different entries [0064], Fig 5 B.

Cathey fails to teach access control lists or explicitly state separate matching tables.

Holdsworth teaches access control lists and separate matching tables (each node may have its own acl) [0048]. Holdsworth also supports that the values in nodes of the same level would be different, or separate ACL's would not be required. It is well known in the art that ACL's contain different values, see also [0104], [0106], [0107].

It would have been obvious to one of ordinary skill in the art to use the ACL of

Holdsworth with the decision levels and fields of Cathey because it allows security and

access control to be performed to enhance network safety.

As per claim 3, Cathey teaches the plurality of fields comprises at least first and second

fields, the first field comprising a source address field and the second field comprising a

destination address field [0063].

As per claim 4, Cathey teaches a final level of the tree representation comprises a

plurality of leaf nodes (packet classification), each associated with one of the actions

(choosing an application) of the plurality of rules (Fig 5B, [0063], [0083]).

As per claim 5, Cathey teaches the root level of the tree representation includes a

plurality of field values, each corresponding to a distinct source address in a first field of

the plurality of rules (header check 1 at the rood may include a source address, compared

to predefined source address table, ([0063] [0076]).

As per claim 6, Cathey teaches a second level of the tree representation includes a

plurality of nodes, each being associated with a subtree of a given one of the distinct

source addresses of the root level of the tree (Fig 5B, [0063]).

As per claim 7. Cathey teaches a given one of the second level subtrees identifies one or

more destination addresses to be examined if the corresponding root level source address

matches a source address of a given received packet. (header check 2 at the node may

include a destination address, (Fig 5B [0063]).

As per claim 8. Holdsworth teaches a matching table at a given level of the tree representation other than a root level of the tree representation comprises at least a portion of a subtree identified by a particular field value from an immediately previous level (nodes may inherit parent ACL lists) [0058].

As per claim 9. Cathey teaches the tree representation is generated by associating a first node at the root level with a given value in a first field (source address) of one of the plurality of rules (packet classification), and then processing remaining field values (destination address) sequentially, with each value in turn being compared to one or more existing values (predetermined information) at the appropriate node(s) of the tree representation to determine if a match exists, and associating that value with a matching table (address table) at one of the nodes of the tree representation based at least in part on the determination (Fig 5B, [0063], [0067], [0078].

As per claim 11. Holdsworth teaches the corresponding actions include at least an accept action and a deny action (allow, deny) [0051].

As per claim 12, Cathey teaches the step of storing at least a portion of the tree representation in memory circuitry accessible to the processor (stored in IRAM connected to packet classification engine) [0030].

As per claims 15, and 20 Cathey teaches a processor having memory circuitry associated therewith; the memory circuitry being configured for storing at least a portion of a multi-level tree representation (stored in IRAM connected to packet classification engine) [0030].

Cathey teaches each of one or more of the levels of the tree representation being associated with a corresponding one of the fields; (extracted fields of header data). Cathey teaches the processor being operative to utilize the stored tree representation to perform a function (classify) [0030]. Cathey teaches at least one level of the tree representation other than a root level of the tree representation comprises a plurality of nodes, (Header Check 2, Fig 5B, [0063] Cathey teaches at least two of the nodes at that level each having a separate matching table associated therewith (header check 2 checks Internet Protocol Destination Address and compares to predefined data, and address tables),([0063], [0067], [0078]). Although the predefined data is not stated as different in Cathey, it would be well known to those of ordinary skill that it would be different as decisions are made to sort data into different branches.[0064], [0067]. Holdsworth below provides additional support. Cathey teaches one level of tables corresponding to a different level with different entries [0064], Fig 5 B.

Cathey fails to teach access control lists or explicitly state separate matching tables.

Holdsworth teaches access control lists and separate matching tables (each node may have its own acl) [0048]. Holdsworth also supports that the values in nodes of the same level would be different, or separate ACL's would not be required. It is well known in the art that ACL's contain different values, see also [0104], [0106], [0107].

Holdsworth teaches access control lists and separate matching tables (each node may have its own acl) [0048].

It would have been obvious to one of ordinary skill in the art to use the ACL of

Holdsworth with the decision levels and fields of Cathey because it allows security and

access control to be performed to enhance network safety.

As per claim 17. Cathey teaches the memory may be integrated with the classification

engine on a controller [0040].

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over in view of

Cathey US 2002/0085560 in view of Holdsworth US 2003/0188198 in view of Miller

US 2003/0005146

As per claim 2, the previous Cathey-Holdsworth combination does not teach longest

prefix matching. Miller teaches using the longest prefix matching (LPM) method,

[0031].

It would have been obvious to one of ordinary skill in the art to use the LPM method of

miller with the system of Cathey-Holdsworth to improve matching efficiency, [0015].

Claims 10, 13, 14, 16, 18, and 19 are rejected under 35 U.S.C. 103(a) as being

unpatentable over in view of Cathey US 2002/0085560 in view of Holdsworth US

2003/0188198 in view of Gai US 6,651,096.

As per As per claim 10, the previous Cathey-Holdsworth combination does not teach

each of at least a subset of the nodes of the tree representation having values in the

matching table are arranged in order of decreasing specificity.

Gai teaches each of at least a subset of the nodes of the tree representation having a
separate matching table associated therewith, values in the matching table are arranged in
order of decreasing specificity (wildcards increase down the list) (Fig 5A Source
Address).

It would have been obvious to one of ordinary skill in the art to use the list of Gai with
the system of Cathey-Holdsworth in order to filter in order of desire.

As per claim 13, the previous Cathey-Holdsworth combination does not teach the
hardware and CPU used in implementing an ACL.

Gai teaches the step of utilizing the stored tree representation to perform an access
control list based function in the processor (teaches using ACL stored in CAM with CPU)
(Col 4 lines 10-25).

It would have been obvious to one of ordinary skill in the art to use the hardware of Gai
with the system of Cathey-Holdsworth because a CPU is necessary to implement
software.

As per claim 14. Gai teaches the access control list based function comprises packet
filtering (receipt and action for packet) (Col 4 lines 30-36).

As per claim 16. Gai teaches the access control list based function comprises packet
filtering (receipt and action for packet) (Col 4 lines 30-36).

As per claim 18, Gai teaches the processor comprises a network processor (intermediate
network device CPU) (Col 4 lines 7-10).

As per claim 19. Gai teaches the processor comprises an integrated circuit (CPU) (Col 4 lines 7-10).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER J. BROWN whose telephone number is (571)272-3833. The examiner can normally be reached on 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on (571)272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher J Brown/   12/8/10
Primary Examiner, Art Unit 2439